

WHAT IS CLAIMED IS:

1. A power conversion apparatus comprising a power module part having semiconductor elements for power control, and a control part for controlling the operation of the semiconductor elements, characterized in that the power module part includes two substrates mounted thereon the semiconductor elements, an output terminal electrically connected to the semiconductor elements, an input terminal electrically connected to the semiconductor elements and composed of a positive side conductor and a negative side conductor which are laminated with each other being electrically insulate from each other, and a container for accommodating the two substrates, the output terminal and input terminal, at least in part, and the two substrates, the output terminal and the input terminal are arranged in the container so that the output terminal and the input terminal are opposed respectively to the two substrates in two different directions on the respective conductor surfaces of the output terminal and the input terminal.

2. A power conversion apparatus comprising a power module part having semiconductor elements for power control, and a control part for controlling the operation of the semiconductor elements, characterized in that the power module part includes two substrates mounted thereon the semiconductor elements, an output terminal electrically connected to the semiconductor elements, an input terminal electrically connected to

the semiconductor elements and composed of a positive side conductor and a negative side conductor which are laminated with each other being electrically insulate from each other, and a container for accommodating the two substrates, the output terminal and input terminal, at least in part, and the output terminal is extended from one of opposed side surfaces of the container inward of the container while the input terminal is extended from the other one of the opposed side surfaces of the container inward of the container, the output terminal and the input terminal being arranged diagonally in the container, and the two substrates are arranged in the container so that they are opposed to the output terminal and input terminal, respectively.

3.           A power conversion apparatus comprising a power module part having semiconductor elements for power control, and a control part for controlling the operation of the semiconductor elements, characterized in that the power module part includes two substrates mounted thereon the semiconductor elements, an output terminal electrically connected to the semiconductor elements, an input terminal electrically connected to the semiconductor elements and composed of a positive side conductor and a negative side conductor which are laminated with each other being electrically insulate from each other, and a container for accommodating the two substrates, the output terminal and input terminal, at least in part, and the two substrates, the output

terminal and the input terminal are electrically insulated, and are arranged on a conductive member in the container so that the two substrates are opposed respectively to the output terminal and the input terminal, in two different directions on the respective conductor surfaces of the output and the input terminals, the semiconductor elements mounted on the two substrates, and the output terminal and the input terminals are electrically connected therebetween in directions in which the two substrates are opposed respectively to the output terminal and the input terminal.

4. A power conversion apparatus comprising a power module part having semiconductor elements for power control, and a control part for controlling the operation of the semiconductor elements, characterized in that the power module part includes two substrates mounted thereon the semiconductor elements, an output terminal electrically connected to the semiconductor elements, an input terminal electrically connected to the semiconductor elements and composed of a positive side conductor and a negative side conductor which are laminated with each other being electrically insulated from each other, and a container for accommodating the two substrates, the output terminal and input terminal, at least in part, and the output terminal is extended from one of opposed side surfaces of the container inward of the container while the input terminal is

extended from the other one of the opposed side surfaces of the container inward of the container, the output terminal and the input terminal being electrically insulated and arranged diagonally on a conductive member in the container, one of the two substrates on which a conductor located on the upper side the input terminal and a semiconductor element electrically connected to the output terminal are mounted is electrically insulated and is arranged on the conductive member so as to be opposed to the output terminal on the side inward of the container, and the output terminal, and the other one of the substrates on which a conductor located on the lower side of the input terminal and a semiconductor element electrically connected to the output terminal is electrically insulated and arranged on the conductive member so as to be opposed to the output terminal and the input terminal on the side inward of the container.

5. A power conversion apparatus comprising a power module part having semiconductor elements for power control and a control part for controlling the operation of the semiconductor elements, the power module part being composed of substrates mounted thereon with the semiconductor elements, output terminals electrically connected to the semiconductor elements, input terminals electrically connected to the semiconductor elements and each composed of a positive side conductor and a negative side conductor which are

laminated with each other being electrically insulated from each other, and a container for accommodating the plurality of the substrates, and the output terminals at least in part, and the input terminals at least in part, characterized in that a plurality of the substrates and the output terminals are alternately arranged in a first row, and a plurality of substrates and the input terminals are alternately arranged in a second row, and the first row and the second row is opposed to each other so that the substrates in these rows are diagonally arranged.

6. A power conversion apparatus comprising a power module part having semiconductor elements for power control and a control part for controlling the operation of the semiconductor elements, the power module part being composed of substrates mounted thereon with the semiconductor elements, output terminals electrically connected to the semiconductor elements, input terminals electrically connected to the semiconductor elements and each composed of a positive side conductor and a negative side conductor which are laminated with each other being electrically insulated from each other, and a container for accommodating the plurality of the substrates, and the output terminals at least in part, and the input terminals at least in part, characterized in that the substrates, the output terminals and the input terminals are electrically insulated and arranged in the container so that a

plurality of the substrates and the output terminal, and a plurality of the substrates and the input terminals are alternately arranged, being opposed to one another, and the positions of the substrates and the positions of the terminals are staggered to one another.

7. A power conversion apparatus comprising a power module part having semiconductor elements for power control and a control part for controlling the operation of the semiconductor elements, the power module part being composed of substrates mounted thereon with the semiconductor elements, output terminals electrically connected to the semiconductor elements, input terminals electrically connected to the semiconductor elements and each composed of a positive side conductor and a negative side conductor which are laminated with each other being electrically insulated from each other, and a container for accommodating the plurality of the substrates, and the output terminals at least in part, and the input terminals at least in part, characterized in that the output terminals are extended from one of opposed side surfaces of the container, and the input terminals are extended from the other one of the opposed side surfaces of the container, the output terminals and the input terminals being staggered with one another in the container, the substrates mounted thereon the semiconductor elements are arranged in the container so as to be opposed to

the output terminals and the input terminals electrically connected to the semiconductor elements.

8.           A power conversion apparatus comprising a power module part having semiconductor elements for power control and a control part for controlling the operation of the semiconductor elements, the power module part being composed of substrates mounted thereon with the semiconductor elements, output terminals electrically connected to the semiconductor elements, input terminals electrically connected to the semiconductor elements and each composed of a positive side conductor and a negative side conductor which are laminated with each other being electrically insulated from each other, and a container for accommodating the plurality of the substrates, and the output terminals at least in part, and the input terminals at least in part, characterized in that the substrates a plurality of the substrates and the output terminals are alternately arranged in a first row, and a plurality of substrates and the input terminals are alternately arranged in a second row, and the first row and the second row is opposed to each other so that the substrates in these rows are diagonally arranged, the semiconductor elements mounted on the substrates, the output terminals and the input terminals are divided into groups each composed of semiconductor elements mounted on two substrates diagonally arranged, and output and input terminals respectively opposed to the

two substrates diagonally arranged, and in each of the groups, the two substrates, and the input terminals and the output terminals are electrically connected in the directions in which they are opposed to one another.

9. A power conversion apparatus comprising a power module part having semiconductor elements for power control and a control part for controlling the operation of the semiconductor elements, the power module part being composed of substrates mounted thereon with the semiconductor elements, output terminals electrically connected to the semiconductor elements, input terminals electrically connected to the semiconductor elements and each composed of a positive side conductor and a negative side conductor which are laminated with each other being electrically insulated from each other, and a container for accommodating the plurality of the substrates, and the output terminals at least in part, and the input terminals at least in part, characterized in that the substrates, the output terminals and the input terminals are electrically insulated and arranged on a conductive member in the container so that the substrates, the output terminals, and the input terminals are electrically insulated and arranged on a conductive member in the container, and accordingly, a plurality of the substrates and the output terminals, and a plurality of the substrates and the input terminals are alternately arranged, respectively, the positions of the substrates and the



positions of the terminals being staggered with each other, the semiconductor elements mounted on the substrates, the output terminals and the input terminals are divided into groups each composed of semiconductor elements mounted on two substrates diagonally arranged, and output and input terminals respectively opposed to the two substrates diagonally arranged, and in each of the groups, the two substrates, and the input terminals and the output terminals are electrically connected in the directions in which they are arranged and in which they are opposed to one another.

10. A power conversion apparatus comprising a power module part having semiconductor elements for power control and a control part for controlling the operation of the semiconductor elements, characterized in that the power module part being composed of substrates mounted thereon with the semiconductor elements, output terminals electrically connected to the semiconductor elements, input terminals electrically connected to the semiconductor elements and each composed of a positive side conductor and a negative side conductor which are laminated with each other being electrically insulated from each other, and a container for accommodating the plurality of the substrates, and the output terminals at least in part, characterized in that the input terminals at least in part, and the output terminals are extended from one of opposed side surfaces of the container, and the input

terminals are extended from the other one of the opposed side surfaces of the container, the output terminals and the input terminals being electrically insulated and staggered with one another on a conductive member in the container, those of the substrates mounted thereon with conductors located on the upper side of the input terminals and semiconductor elements electrically connected to the output terminals are electrically insulated and arranged on the conductive member so as to be opposed to the associated output terminals on the side inward of the container, and the associated input terminals, and those of the substrates mounted thereon with conductors located on the lower side of the input terminals and semiconductor elements electrically connected to the output terminals are electrically insulated and arranged on the conductive member so as to be opposed to the associated output terminals and the associated input terminals on the side inward of the container.

11. A power conversion apparatus as set forth in any one of claims 1 to 10, characterized in that the input terminals have the conductors located on the lower side thereof are extended inward by a length longer than that of the conductor located on the upper side thereof.

12. A power conversion apparatus as set forth in claim 11, characterized in that the conductor located on the lower side of the input terminal is a negative

side conductor, and the conductor located on the upper side of the input terminal is a positive side conductor.

13. A mobile object comprising a vehicle body, front and rear wheels rotatably mounted to the vehicle body, a motor for driving either of the front and rear wheels, a battery device for accumulating drive power fed to the motor, and a power conversion apparatus for converting D.C. power fed from the battery device, into A.C. power, characterized in that a power conversion apparatus as set forth in any one of claims 1 to 12 is used as the power conversion apparatus.

14. A mobile object comprising a vehicle body, front and rear wheels rotatably mounted to the vehicle body, an internal combustion engine for driving either of the front and rear wheels, a motor for driving, instead of the internal combustion engine, either of the front and rear wheels, a battery device for accumulating drive power fed to the motor, and a power conversion apparatus for converting D.C. power fed from the battery device, into A.C. power, characterized in that a power conversion apparatus as set forth in any one of claims 1 to 12 is used as the power conversion apparatus.

15. A mobile object comprising a vehicle body, front and rear wheels rotatably mounted to the vehicle body, an internal combustion engine for driving either of the front and rear wheels, a motor for driving the

other of the front and rear wheels, a battery device for accumulating drive power fed to the motor, and a power conversion apparatus for converting D.C. power fed from the battery device, into A.C. power, characterized in that a power conversion apparatus as set forth in any one of claims 1 to 12 is used as the power conversion apparatus.